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LIFE EXPECTANCY OF LOW GRADE MENTAL
DEFECTIVES

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LIFE EXPECTANCY OF LOW GRADE MENTAL DEFECTIVES^{1, 2}

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The mortality of mental defectives has been the subject of a number of studies. Prominent among these investigations have been those of Dayton (5), Barr (1), Miner (12), Martz (11), and a number of studies reported by Tredgold (20) and Ireland (10). All workers in this field are agreed that idiots and imbeciles, on the average, submit to an early death. It is the purpose of the present paper to single out for special study those idiots and imbeciles who have survived beyond 50 years of age, and to inquire into the conditions that influence the longevity of mental defectives.

It must be emphasized that statistics based on institutional findings cannot be extended, without proper reservations, to mental defectives in general. It is well known, for instance, that only a small percentage of the feeble-minded are confined to special institutions for their care. Most of them reside at large in the community, while large numbers are to be found in prisons, almshouses, and mental hospitals for the insane. The high percentage of moron separations from institutions, due to discharge, renders unreliable any conclusions based on their mortality in such institutions.

Pintner (18) has pointed out that the mortality for institutionalized defectives may be higher than for the feeble-minded in general, since only the most helpless find their way into institutions. Many idiots and imbeciles die soon after birth, and hence are never admitted to institutions. Since mental defectives in institutions are clearly a highly selected group, any sex differences

¹ Presented before the American Psychological Association at Stanford University, September 4, 1939. I am indebted to Professor Olga Bridgman for valuable suggestions and advice. I also wish to acknowledge the assistance of Dr. F. O. Butler, Medical Director and Superintendent, and Mrs. Grace M. Waterhouse, School Principal, of the Sonoma State Home at Eldridge, California.

² Recommended for publication by Dr. E. S. Conklin, February 2, 1940.

that may emerge from their study are not above suspicion.

The present paper represents an analysis of the life duration of 768 idiots and imbeciles dying in the Sonoma State Home at Eldridge, California between the years 1917-1939. The average life span of the 424 imbeciles was 26.60 years and that of the 344 idiots was 19.04 years. These figures do not include epileptics. This sharp difference between the life duration of idiots and imbeciles is in agreement with other investigations. Dayton (5) reports a study of the mortality of 8976 institutionalized feeble-minded in Massachusetts over a period of 14 years. He finds a mortality rate for morons only slightly higher than that of the general population, while the death rate of the imbeciles is about twice as high, and that of the idiots about five times as high as the general population. Tredgold (20, p. 154) recognizes the higher mortality of idiots as compared with other groups of mental defectives, and points out the relation between vitality and the degree of mental defect. He says: "This defective vitality is directly related to the degree of mental defect, and, in general, the greater the mental defect, the shorter will be the life" (p. 149). The difference in mortality between idiots and imbeciles can best be explained as due to the greater number and more serious nature of physical anomalies in the idiot group, which predisposes them to an early death.

It will later be pointed out that the life duration of idiots and imbeciles who survive beyond 50 years is, in terms of averages, practically identical. Since the terms "idiot" and "imbecile" do not constitute homogeneous categories, it is impossible to speak of the life expectancy of idiots or imbeciles in general terms.

CAUSES OF DEATH

Doll, Phelps, and Melcher (6) have made an extensive study of mental deficiency due to birth injuries. They find that not all types of birth injury predispose to an early death, and that there is a definite tendency toward physical improvement in those children that survive. A large number of children suffering from intracranial injuries die at birth or soon after. Doll, Phelps, and Melcher state that it is not unlikely that lesions which do not affect the motor areas simulate other forms of mental deficiency, and are

often mistaken for primary amentia of any degree from morosity to idiocy.

Brousseau (3) has commented on the short life span of Mongolians. She cites a study by Pearce and Rankine at the Earlswood Asylum, England, who, on the basis of 50 consecutive deaths, fix the average age at death of Mongolians at $14\frac{1}{2}$ years. However, great numbers die in infancy and never reach institutions. Brousseau believes a Mongol woman aged 57 reported by J. Langdon Down to be the oldest on record, but apparently this distinction now goes to a Mongol man aged 69 who died recently at the Sonoma

TABLE 1

AGE AT DEATH OF 768 IDIOTS AND IMBECILES DYING IN THE SONOMA STATE HOME BETWEEN 1917-1939

Age at Death	Male Idiots	Male Imbeciles	Female Idiots	Females Imbeciles
1-5	34 (16.19%)	25 (10.92%)	24 (17.91%)	19 (9.75%)
6-10	44 (20.90%)	33 (14.41%)	25 (18.66%)	17 (8.72%)
11-15	25 (11.90%)	33 (14.41%)	21 (15.67%)	26 (13.33%)
16-20	24 (11.41%)	35 (15.28%)	15 (11.20%)	30 (15.38%)
21-25	25 (11.90%)	24 (10.48%)	16 (11.94%)	11 (5.64%)
26-30	19 (9.05%)	16 (6.99%)	7 (5.22%)	11 (5.64%)
31-35	10 (4.76%)	11 (4.80%)	7 (5.22%)	13 (6.67%)
36-40	8 (3.81%)	8 (3.50%)	5 (3.73%)	9 (4.62%)
41-45	4 (1.90%)	4 (1.75%)	5 (3.73%)	16 (8.21%)
46-50	3 (1.43%)	13 (5.68%)	4 (2.98%)	9 (4.62%)
51-55	6 (2.86%)	7 (3.06%)	3 (2.24%)	5 (2.56%)
56-60	6 (2.86%)	10 (4.37%)	1 (0.75%)	6 (3.08%)
61-65	1 (0.48%)	2 (0.87%)	0	6 (3.08%)
66-70	1 (0.48%)	5 (2.19%)	0	8 (4.11%)
71-75	0	2 (0.87%)	0	4 (2.05%)
76-80	0	0	1 (0.75%)	3 (1.54%)
81-85	0	1 (0.44%)	0	1 (0.51%)
86-90	0	0	0	1 (0.51%)
	210	229	134	195

State Home. Respiratory diseases, principally tuberculosis and pneumonia, are the leading causes of death in Mongolians at all ages. The climate of California seems to be especially favorable for Mongolians, and many survive to middle life at both the Pacific Colony near Los Angeles and the Sonoma State Home. However, most Mongolians succumb to an early death. The short life span of the Mongol was noted as early as 1903 by Spicer (19) who based

TABLE 2
CAUSES OF DEATH IN 91 IDIOTS AND IMBECILES SURVIVING BEYOND 50 YEARS OF AGE AT THE SONOMA STATE HOME

Cause	Male Idiots	Male Imbeciles	Female Idiots	Female Imbeciles
Broncho-Pneumonia	4 (23.53%)	5 (16.66%)	3 (42.86%)	5 (13.51%)
Hypostatic Pneumonia	0	4 (13.33%)	0	0
Lobar Pneumonia	1 (5.88%)	1 (3.33%)	0	5 (13.51%)
Cerebral Hemorrhage	1 (5.88%)	2 (6.67%)	0	2 (5.41%)
Arteriosclerosis	2 (11.77%)	7 (23.33%)	2 (28.57%)	10 (27.03%)
Myocarditis	1 (5.88%)	2 (6.67%)	0	1 (2.70%)
Pericarditis	0	0	0	2 (5.41%)
Tuberculosis	4 (23.53%)	4 (13.33%)	1 (14.29%)	2 (5.41%)
Cancer	2 (11.77%)	2 (6.67%)	0	1 (2.70%)
Intestinal Rupture or Obstruction	0	1 (3.33%)	1 (14.29%)	1 (2.70%)
Influenza	0	1 (3.33%)	0	0
Uremic Poisoning	2 (11.77%)	1 (3.33%)	0	1 (2.70%)
Gangrene	0	0	0	1 (2.70%)
Epilepsy	0	0	0	1 (2.70%)
Nephritis	0	0	0	2 (5.41%)
Streptococcus Septicemia	0	0	0	2 (5.41%)
Unknown	0	0	0	1 (2.70%)
	17	30	7	37

his conclusions on 23 cases. The oldest of his patients was 11 years old, while 19 were under 6. The premature appearance of certain senile features has attracted frequent comment in the literature.

Although cretinism and other forms of glandular dysfunction are not always direct causes of death, still they predispose to a weakened resistance and to premature senility. Cranial anomalies, such as micro-, macro-, and oxycephalus may but do not always lead to an early death. A microcephalic woman imbecile with a brain weight of 530 gms. died recently at the age of 89 at the Sonoma State Home. Certain extreme forms of hydrocephalus are doomed to an early death.

An analysis of the causes of death among idiots and imbeciles at the Sonoma State Home reveals respiratory disease (especially tuberculosis and pneumonia) as the leading cause of death at all ages. There is an increase in the number of circulatory failures with increasing age. Pronounced arteriosclerosis in the early fifties is not uncommon (Table 2). Relatively few deaths are primarily due to nervous lesions or disease, and such deaths as do occur are found chiefly in the early years of life. Since cases diagnosed as epileptics were not included in the present study, the paucity of nervous mortality here reported is not surprising.

The greatest number of deaths at the Sonoma State Home occurred before 20 years of age (Table 1). This corroborates a number of other studies that have been made. Barr (1) reports a study of death periods and causes in 625 cases of mental deficiency. The largest number of deaths occurred between 10 and 25, while comparatively few survived beyond 25. Exceptional cases between 30 and 40 years were observed. Tuberculosis was the leading cause of death, closely followed by epilepsy and diseases of the digestive system.

Ireland (10) cites an investigation by Shuttleworth of the average age at death at the Earlswood and Royal Albert Asylums in England. It was found that the greatest number of mortalities occurred between the ages of 5 and 10, closely followed by the age groups between 15 and 20, and 10 and 15. Tredgold (20) and Martz (11) found the largest number of deaths to occur between 15 and 20, a period during which the mortality in the general popu-

lation is at its lowest. Martz found tuberculosis to be the leading cause of death in his group. Tredgold has summarized the causes of death as found in the four institutions described by him (mostly children and adolescents). In the order of their frequency these are: (a) tuberculosis; (b) pulmonary diseases; (c) diseases of the central nervous system; and (d) infectious diseases.

SEX DIFFERENCES

Female imbeciles have a 5.65 years greater life expectancy than male imbeciles, though they live under practically identical conditions at the Sonoma State Home. The average life duration of the 229 male imbeciles was 24.00 and that of the 195 female imbeciles was 29.65 years. On the other hand, the idiots exhibited no such sex discrepancy. The average life span of 210 male idiots was 19.28 years and that of the 134 female idiots 18.66 years. It will be observed from Table 1 that the greatest number of female imbecile deaths occurs in the period between 16 and 21, whereas the greatest number of male imbecile deaths occurs in the period between 6 and 11.

It seems probable that the same factors which produce the longer life span of women in the general population are operative here. It is interesting to note that the average life duration of the 37 female imbeciles surviving beyond 50 years of age is 64.54 years as against 59.83 years for the 30 male imbeciles surviving beyond 50 years of age. It is also interesting to note that the 17 male idiots surviving beyond 50 had an average life duration of 55.41 years as against 58.86 years for the 7 female idiots who survived to this age. It is possible that biological differences between the sexes are accentuated by mental deficiency, a possibility which Bridgman (2) has advanced in explanation of observed differences in test performance.

IDIOTS AND IMBECILES OVER 50

Most studies on the life expectancy of low grade mental defectives have underemphasized the fact that many are capable of surviving to advanced years. Statistical averages do not always give an accurate picture of the potential life expectancy of certain types

TABLE 3

AGE AT DEATH OF PARENTS OF IDIOTS AND IMBECILES
SURVIVING BEYOND 50 YEARS OF AGE AT THE
SONOMA STATE HOME (MID-PARENT AGE)

	Male Idiots	Male Imbeciles	Female Idiots	Female Imbeciles
36-40	0	1 (4.00%)	0	0
41-45	0	0	0	1 (3.70%)
46-50	0	0	0	0
51-55	0	2 (8.00%)	0	1 (3.70%)
56-60	1 (9.09%)	1 (4.00%)	0	2 (7.41%)
61-65	1 (9.09%)	1 (4.00%)	0	4 (14.82%)
66-70	1 (9.09%)	1 (4.00%)	0	3 (11.11%)
71-75	2 (18.18%)	3 (12.00%)	1 (14.29%)	5 (18.52%)
76-80	0	3 (12.00%)	2 (28.57%)	2 (7.41%)
81-85	1 (9.09%)	0	0	1 (3.70%)
Living*	5 (45.45%)	13 (52.00%)	4 (57.14%)	8 (29.63%)
	11	25	7	27

* One or both parents still living at time patient admitted to the Sonoma State Home.

of mental defectives. Goddard (9) was one of the first to point out the potential longevity of mental defectives.

Of the 768 idiots and imbeciles who died at the Sonoma State Home between the years 1917-1939, 15.80 per cent of the imbeciles and 7.00 per cent of the idiots survived beyond 50 years of age. There are now living at the Sonoma State Home 208 low grade aments above 50 years of age: 26 female idiots with an average age of 58.27 years; 93 female imbeciles with an average age of 59.00; 65 male imbeciles with an average age of 57.00; and 24 male idiots with an average age of 57.37.

An investigation of the life duration of the parents of the 91 aments who died above 50 was conducted. The results obtained in the 70 cases where records were available are tabulated in Table 3. That heredity is an important factor in the life expectancy of the normal population has been shown by Pearl and Pearl (15) and others. Apparently, no study has ever been made of the longevity of the parents of mental defectives. It is interesting to note from

Table 3 that many mental defectives have very long-lived parents, and that the mid-parent age at death (of mental defectives dying beyond 50) is in the majority of cases well above 60. This indicates that heredity may be invoked as a partial explanation of their longer life span. Still, it is unwise to interpret the longevity of mental defectives as solely a function of heredity. Many idiots and imbeciles succumbing to the effects of birth injuries and congenital anomalies possess extremely long-lived forbears. It is also interesting to note that many mental defectives live considerably longer than either parent. This may be due to the more favorable environment of the institution.

DISCUSSION

The favoring climate of California may be a factor in the comparatively long life of aments at the Sonoma State Home as compared with other institutions. The patients are able to remain out of doors for large portions of the year, and this is especially significant since respiratory disease is the leading cause of death. Competent medical care, adequate diet, regular hours, and a minimum of worries all conduce to long life. Dublin and Lotka (7) have indicated that the more strenuous occupations are not favorable to long life, and the comparative ease of institutional existence is not without its effects.

The life duration of mental defectives is not without implications for the physiology of ageing. The role of the nervous system in life duration has been considered by a number of investigators. Friedenthal (8) has set up a cephalization index, the ratio between brain weight and two-thirds of the body weight. Two-thirds of the body weight instead of its full value is used because Friedenthal considers this to be the weight of functionally significant structures as apart from those tissues that are purely supporting. This cephalization factor varies from species to species in very close correspondence with the maximal attainable length of life. This observation, interesting though it is, is rendered unreliable by numerous exceptions. Child (4) believes that the nervous system, being least capable of progressive change, is the first to die. Nervous tissue, Child points out, has an exceptionally high metabolic rate, and

cerebral activity is extremely sensitive to lack of oxygen. Muhlmann (13, 14) attributes physiological death to the breakdown of nervous tissue, especially of the brain.

Pearl (16) examines the breakdown of the nervous system from the standpoint of evolution. He finds that there is a regular progression of increasing mortality due to the nervous system as we go up the evolutionary scale. He points out, however, that in comparison with the breakdown of other systems, the nervous system ranks lowest in the number of its mortalities.

The relatively small percentage of deaths in mental defectives due to nervous disturbances indicates that intelligence *per se* is not essential to long life. It appears that the nervous system is part of an integrated organism in which it is one of the most resistant components. The case previously cited of an 89-year-old microcephalic woman with a brain weight of 530 gms. indicates that a small brain is not incompatible with long life. The atrophy of the endocrines, kidneys, lungs, blood vessels, and other body organs in the general population usually occurs long before there is any mental impairment. Atrophy of the nervous system can logically be considered as due to these forces. It may be that the effective functioning of subcortical structures is more important for long life than the cerebral cortex.

This must not be misconstrued to imply that intelligence is not an important factor in length of life. Since the early detection of disease is an important consideration in its successful treatment, and since much in medical diagnosis is dependent upon the co-operation of the patient, special difficulties exist in the case of low grade mental defectives. Furthermore, they are often possessed of unclean habits which predispose to disease.

A number of unfavorable factors exist in institutions. Many of them are badly overcrowded, with the result that diseases such as influenza, tuberculosis, and enteritis are bound to assume epidemic proportions, once they get under way. It has been observed that if new patients acclimate themselves to the institution within the first few years, there is a tendency for them to survive.

On the basis of the results obtained in the present study, and if present trends are continued, it is reasonable to predict a sub-

stantial increase in the life expectancy of low grade mental defectives. Since the life expectancy of the higher grades today approximates the normal population, it is certain that they will share in the longer life duration of that population. The death rate of children in the general population is being continually reduced, and it is reasonable to suppose that the decreasing death rate due to tuberculosis will be extended to mental defectives. Penrose (17) has shown that the introduction of better methods for the diagnosis and treatment of tuberculosis in defectives in England has dramatically reduced the deaths due to this disease. There is, as yet, no conclusive evidence that mental defectives in general are naturally more susceptible to pulmonary tuberculosis. There is hope that pneumonia will soon be brought under control, and this will remove another important cause of death.

Since diseases or incapacities directly associated with mental deficiency seem to be a minor cause of death, it is likely that developments in preventive medicine and their exercise in institutions for the mentally deficient will produce a marked increase in the life duration of defectives, and therefore in the size of the institutions responsible for their care. This will result in a marked increase in the expenditures necessary for their support.

SUMMARY

1. A study was made of the life duration of 768 idiots and imbeciles dying in the Sonoma State Home between the years 1917-1939. The average life span of the 424 imbeciles was 26.60 years and that of the 344 idiots was 19.04 years.
2. Respiratory diseases are shown to be the major cause of death at all ages; deaths due directly to nervous disease are negligible.
3. Female imbeciles outlive male imbeciles by 5.65 years, although they live under practically identical conditions.
4. It is shown that 15.80 per cent of the imbeciles and 7.00 per cent of the idiots survived beyond 50 years of age, and that 208 low grade aments above 50 are still living at the Sonoma State Home. Evidence is introduced which indicates that heredity may be a factor in the longevity of mental defectives.

5. On the basis of the results obtained, and if present trends are continued, a substantial increase in the life expectancy of mental defectives is predicted.

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